

# **FY 1999 COMBINED RESEARCH-CURRICULUM DEVELOPMENT (CRCDD) PROGRAM**

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## ***Program Announcement and Guidelines NSF 99-72***

DIRECTORATE FOR ENGINEERING

DIRECTORATE FOR COMPUTER AND INFORMATION  
SCIENCE AND ENGINEERING

**STATEMENT OF INTENT DEADLINE (OPTIONAL):  
March 19, 1999**

**PROPOSAL DEADLINE: May 21, 1999**



NATIONAL SCIENCE FOUNDATION

# **SUMMARY OF PROGRAM REQUIREMENTS**

## **GENERAL INFORMATION**

**Program Name:** Combined Research-Curriculum Development (CRCD) Program

### **Short Description/Synopsis of Program:**

The Combined Research-Curriculum Development Program is a jointly initiated by the Directorate for Engineering (ENG) and the Directorate for Computer and Information Science and Engineering (CISE), supports multidisciplinary projects that integrate new, state-of-the-art research advances in emerging technology areas into upper level undergraduate and introductory graduate engineering and computer and information science curricula. Projects address a need for innovative curricula, courses, textbooks, instructional modules and instructional laboratories by integrating the research and education interests of faculty through involvement in curriculum change. The CRCD program seeks to closely engage faculty researchers, with support of academic administration and industry, in curriculum innovation in the context that education and research are of equal value and complementary parts of an integrative engineering and science education enterprise.

**Cognizant Program Officer(s):** Mrs. Mary Poats, Program Manager, Room 585, Division of Engineering Education and Centers, telephone 703- 306-1380, e-mail: mpoats@nsf.gov.

**Applicable Catalog of Federal Domestic Assistance (CFDA) No.:** 47.041 - Engineering Grants and 47.070 - Computer and Information Science and Engineering

## **ELIGIBILITY**

- Limitation on the categories of organizations that are eligible to submit proposals:

**U.S. academic institutions with undergraduate and/or graduate engineering and/or computer and information science research and education programs may submit proposals in response to this announcement.**

- PI eligibility limitations: **None**
- Limitation on the number of proposals that may be submitted by an organization:

**An institution may submit no more than three (3) proposals in response to this announcement, as the sole or lead institution, in case of multi-institution proposals.**

## **AWARD INFORMATION**

- Type of award anticipated: **Standard Grant**
- Number of awards anticipated in FY 99: **8-10 awards**
- Amount of funds available: **Approximately \$4.6 million will be available for this program in FY 1999**
- Anticipated date of award. **September 1999**

## **PROPOSAL PREPARATION & SUBMISSION INSTRUCTIONS**

- **Proposal Preparation Instructions**
  - Letter of Intent requirements: **Optional: 5:00 PM, Submitter's Local Time, March 19, 1999**
  - Preproposal requirements: **None**
  - Proposal preparation instructions: **Standard NSF Grant Proposal Guide instructions**
  - Supplemental proposal preparation instructions: **None**
  - Deviations from standard (GPG) proposal preparation instructions: **None**
- **Budgetary Information**
  - Cost sharing/matching requirements-  
  
**Cost sharing at a level of at least 25% of total eligible project costs is required from academic institutions participating in proposals submitted in response to this announcement. The proposed cost sharing must be shown on line M on the proposal budget (NSF Form 1030.)**
  - Indirect cost (F&A) limitations: **None**
  - Other budgetary limitations: **None**
- **FastLane Requirements**
  - FastLane proposal preparation requirements: **FastLane use required**
  - FastLane point of contact: **Directorate FastLane representative - Cheryl Albus, 703-306-1302, e-mail address: [calbus@nsf.gov](mailto:calbus@nsf.gov)**

- **Deadline/Target Dates**

- Full Proposal Deadline **5:00 PM, Submitter's Local Time, May 21, 1999**

**PROPOSAL REVIEW INFORMATION**

- Merit Review Criteria: **Standard National Science Board approved criteria**

**AWARD ADMINISTRATION INFORMATION**

- Grant Award Conditions
- Special grant conditions anticipated: **None anticipated**
- Special reporting requirements anticipated: None

## **1. Introduction**

Preeminence in science and technology has been a foundation of this Nation's strength for much of its history. Throughout its own history, the National Science Foundation (NSF) has strived to enable the Nation to uphold a position of world leadership in all aspects of science, mathematics, and engineering by promoting the discovery and use of new knowledge in service to society along with excellence in education at all levels. The Foundation has served as the catalyst for the pursuit of excellence in research and education by U.S. academic institutions and has provided leadership and stewardship for institutions engaged in learning and discovery. Now, new challenges must be addressed by the research and education communities, challenges that can only be successfully addressed and met through partnerships that build on and integrate the strengths of each community. The Foundation's role in this process will continue to stimulate the pursuit of excellence through the implementation of four core strategies: developing intellectual capital, strengthening the physical infrastructure, integrating research and education, and promoting partnerships.

The Combined Research-Curriculum Development (CRCD) Program, a joint initiative of the Directorate for Engineering (ENG) and the Directorate for Computer and Information Science and Engineering (CISE), reflects all four of these core strategies in pursuit of the goal of achieving for the Nation, engineering and computer and information science education that is dynamic, relevant, and connected to the changing needs of industry and society and to emerging technology areas.

## **2. Objectives**

The CRCD Program contributes to achieving this goal through its support of multidisciplinary projects that integrate new, state-of-the-art research advances in emerging technology areas into upper level undergraduate and introductory graduate engineering and computer and information science curricula. Projects address a need for innovative curricula, courses, textbooks, instructional modules and instructional laboratories by integrating the research and education interests of faculty through involvement in curriculum change. Thus, NSF through the CRCD program seeks to closely engage faculty researchers, with support of academic administration and industry, in curriculum innovation in the context that education and research are of equal value and complementary parts of an integrative engineering and science education enterprise.

CRCD projects should provide leadership both at the participating institutions and nationally for creating new models of learning and teaching environments. CRCD projects should incorporate learning theory and cognitive sciences research that promotes student-based learning styles; integrate their education and research roles; stress active, collaborative learning with less dependence on lectures; utilize emerging information technologies and network communications and develop students' capability and motivation to engage in lifelong learning.

### **3. Project Areas**

Each proposal submitted to the FY 1999 CRCD program competition must focus on a particular topic which is of industrial and national importance in research areas supported by either the Directorate for Engineering (ENG) or the Directorate for Computer and Information Science and Engineering (CISE). The topic area should be one in which the development of educational materials and curricula, based on newly created fundamental engineering and computer and information science knowledge, enhance the education and careers of future engineers and scientists by enabling them to compete in the global environment.

### **4. Project Components**

There are five project components within a CRCD project that must be described in detail in the proposal.

#### **A. Research**

Key features of the research component include:

- High-quality, innovative research in emerging technologies, currently underway or recently completed. The research need not have been supported by the NSF but the Principal Investigator(s) must have demonstrated research expertise in the proposed topic area;
- The existence of a sufficient body of research ready and appropriate to be integrated into engineering and/or computer and information science curriculum development and classroom testing; and
- An analysis of the state-of-the-art and practice in the technology area and the rationale of the need for the proposed curriculum development.

#### **B. Curriculum Development**

Key features of the curriculum development component include:

- Analysis of the need for the proposed curriculum innovation in the technology area and the institution(s) curriculum, and rationale for this innovation as related to curriculum development efforts currently underway in the same topic area at the proposing institution(s) or elsewhere;
- Development of innovative upper level undergraduate and/or introductory engineering and/or computer and information science graduate course(s), a major entrance course of study, and/or course modules for insertion in an ongoing or new course or curricula;

- Rationale for how the proposed innovation will fit into the institution's current engineering and/or computer and information science curricula and the expected impact of the innovation;
- Methodology to incorporate and institutionalize the proposed curriculum innovation into the existing engineering and/or computer and information science curricula;
- Clear articulation of the knowledge, competencies and skills students will have as a result of the curriculum innovation;
- Clear articulation of the goals and objectives of the proposed curriculum, with appropriate metrics identified for project evaluation;
- Emphasis on stimulating critical thinking, intellectual growth and communications skills;
- Innovative educational delivery and interactive learning technologies that take full advantage of modern educational and/or research technology and that incorporate research on learning and pedagogy and promote active learning; and
- Inclusion of team-based projects relevant to industrial applications.

### **C. Participants**

It is encouraged that these projects be multidisciplinary and the proposing team include faculty from engineering, computer and information science, and other disciplines, as appropriate, to address the topic. It is encouraged that the project include participation by undergraduate and/or graduate students. If multimedia courseware is to be developed, it is encouraged that the team include experts in instructional design/technology and pedagogy.

Multi-institution participation is encouraged in order to both expand the range of expertise in curriculum development and the impact of dissemination. Involvement by persons with expertise in educational methodologies and pedagogy is encouraged for all projects. Because one of the goals of the CRCDD program is to prepare engineering and computer and information science students to perform in a rapidly changing, increasingly competitive and global, industrial environment, it is desired that there be substantive, active involvement of industrial participants in these projects throughout the period of the award. Participation by professional society colleagues and national laboratory participants is encouraged where appropriate.

#### **D. Project Evaluation/Implementation/Dissemination**

Projects supported under the CRCDD program are inherently innovative and experimental in character. Thus, it is essential that the methodologies and results of each project be subjected to careful evaluation to ensure that the objectives of the project are being met by the resulting innovation. As a minimum please include within the body of the proposal a table (See Table 1-Sample Format below) with baseline information displayed in columns for each year of the project to show the potential impact of the proposed project. In order to develop effective measures for evaluation, cooperation with persons experienced in educational assessment and evaluation is strongly encouraged. A major criterion in proposal evaluation will be the strength of the evaluation system proposed. This system must include, as a minimum, measurable objectives (for example, objectives for student learning); procedures to measure their achievement; and a system for monitoring the progress of the project in relation to these measures. Reliable evaluation usually requires multiple measures. NSF resource materials are available to assist institutions in developing and implementing a sound educational assessment program, including reports of the Education and Human Resources Directorate, Division of Research, Evaluation, and Communication [1-2] and engineering education evaluation workshops funded by the Engineering Directorate Division of Engineering Education and Centers [3]. NSF may work with the proposer(s) during the award process to develop special evaluation mechanisms when merited by the scale and cost of the project. NSF may also request the cooperation of individual projects in the collection of specific data via survey or other mechanisms to enable evaluation of the combined effect of its engineering and computer and information science education programs.

To achieve the desired national impact, project results must be evaluated and then disseminated widely within the engineering and computer and information science education community once they have been demonstrated effective in accomplishing the projects objectives. The impact of a project depends on the quality and utility of what is learned or produced and upon the breadth and effectiveness of the related dissemination activities. Therefore, the plan for dissemination of project results is a very important component of CRCDD projects and should be thought through and articulated carefully in the proposal. A dissemination plan should include designation of the audience to be reached, a description of the information or material to be disseminated, the means of dissemination (such as delivery by electronic means, through workshops, conference presentations, textbooks, laboratory manuals, software, audiovisual materials, journal articles, etc.), how these products will be made available to the engineering education and/or computer and information science community and others, the type of assistance available, and procedures and metrics to determine the success of the dissemination effort.

Multiple dissemination approaches are strongly encouraged. If this project involves the development of materials or publications which will be disseminated commercially and in the event that an award is made, the grantee is responsible for developing, documenting and implementing a publication or distribution plan which includes, at the minimum, the following elements:

- Procedures to be followed for selection of a publisher or distributor so as to ensure reasonable competition or justification for non-competitive selection;
- Delineation of the criteria used in the selection of the publisher or distributor; and
- Steps taken to prevent conflicts of interest in the selection of a publisher or distributor.

The Grantee shall ensure that the publisher or distributor of any material supported under this NSF award agrees to provide the Government with a nonexclusive, nontransferable, irrevocable, royalty-free license to exercise or have exercised for or on behalf of the United States throughout the world all the exclusive rights provided by copyright. Such license does not include the right to sell copies or photo records of the copyrighted works to the public. Any publication or distribution agreement must be consistent with NSF's Grant Policy Manual (NSF 95-26) and the Grant General Conditions.

It is expected that the institution(s) involved in the CRCD project will provide the leadership needed to ensure that the courses and curriculum developed as a result of the project will be implemented and institutionalized. Therefore, please include in the proposal a milestone chart showing development, pilot studies, implementation, evaluation, dissemination, and completion of deliverables.

**Table 1-Sample Format**

Institution/ Department	Course #/ Title/ Instructor	Course Level	# Students Enrolled Per Offering	Required/ Elective	Course Offering Frequency	Brief Description of Course Innovation
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## **E. Cost Sharing**

**Cost sharing in the amount of at least 25% of the total amount requested from NSF is required from all academic institution(s) participating in the proposal.** The cost sharing may come from any private or non-Federal public source and may be in cash or in-kind, fairly valued. For examples of eligible cost sharing see OMB Circular A-110, Section C, Subpart. 23. Cost sharing is strongly encouraged from industry or other organizations. The details for all cost sharing should be included as an attachment to the budget.

**Cost sharing specified in the proposal will be referenced and included as a condition of any award resulting from this announcement.**

## **5. Who May Submit**

U.S. academic institutions with undergraduate and/or graduate engineering and/or computer and information science research and education programs may submit proposals in response to this announcement. An institution may submit **no more than three (3)** proposals in response to this announcement as the sole or lead institution, in case of multi-institution proposals. Investigators involved in existing NSF-funded research and education projects, including centers and coalitions, are welcome to participate in the program.

## 6. Statement of Intent

To assist in the selection of reviewers and for other planning purposes, the proposed Principal Investigator(s) should indicate plans to submit a proposal by submitting a **one paragraph** statement of intent to the Engineering Education and Centers (EEC) Division by **5 p.m., Friday, March 19, 1999 (Submitter's Local Time)**. **This statement of intent is optional**. This statement should contain the title, technology area of the proposed effort, Principal Investigator(s), institution(s), and the disciplines involved. Please send this information by any of the following means: by e-mail to mpoats@nsf.gov, by FAX at (703) 306-0290 or -0326, or by letter to Mrs. Mary Poats, ENG/EEC, Room 585, 4201 Wilson Blvd., Arlington, VA 22230.

## 7. Number, Size, and Duration of Awards

Proposals will be reviewed by panels of outside experts according to the review criteria in Section 9. These panels will be composed of individuals who have expertise in the technical areas supported by the ENG Divisions and the CISE Directorate and expertise in engineering and science education. Approximately 8 to 10 awards are planned for Fiscal Year 1999. The projects may total up to \$500,000 each, with a maximum duration of three years.

**A proposal involving collaborative or joint arrangements with more than one institution must be submitted by one lead institution only, with the other institutions as subawardees. If an award is made under the CRCD program, it will be made to the lead submitting institution only.**

## 8. Proposal Guidelines and Format

**A. General: Proposals must follow the guidelines set forth in the NSF Grant Proposal Guide (GPG) (NSF 99-2). <http://www.nsf.gov/cgi-bin/getpub?nsf992>**

Please conform to the proposal format and submission requirements included in the GPG (NSF 99-2).

- NSF Form 1225 (GPG) for the Principal Investigator. Attach one copy to the original, signed copy of the proposal. Do not attach it to any of the other copies, since this would compromise the confidentiality of the information.
- Cover Sheet (NSF Form 1207, page 1 of 2, all copies). Identify the Division of Engineering Education and Centers (ENG/EEC) as the NSF Organizational Unit, and NSF 99-72, as the Program Announcement Number in the block "Program Announcement/Solicitation No./Closing Date."
- Certification Page (NSF Form 1207, page 2 of 2) is to be included only in the copy that bears the original signatures. This form should be signed by the Principal Investigator(s) and an official authorized to commit the institution in business and governmental affairs.

- Project Summary -Proposal Section A (not to exceed one page).  
The proposal must contain a summary of the proposed activity suitable for publication, not more than one page in length. It should not be an abstract of the proposal, but rather a self-contained description of the activity that would result if the proposal were funded. The summary should be written in the third person and include a statement of objectives, methods to be employed and the potential impact of the project on advancing knowledge, science and mathematics education, and/or human resource development. It should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader. (not part of the proposal page limit).
- Table of Contents (NSF Form 1359)-Proposal Section B. Note that the pages are to be numbered consecutively within each Section. (not part of the proposal page limit).
- Project Description -Proposal Section C (Including Results from Prior NSF Support)  
A narrative consisting of no more than 15 typed pages, (including tables, figures) describing the five project components listed above in (Section 4) of the proposed CRCD project. Standard letter-size paper, 2.5 cm margins, and a font of 12 points must be used. Line spacing (single-spaced, double spaced, etc.) is at the discretion of the proposer, however established page limits must be followed. If the proposal exceeds the page limit for text, it will be returned without review.

**A. Special Information and Supplementary Documentation-Proposal Section I** (not part of the proposal page limit) For proposals submitted via FastLane, special information or supplementary documentation should be included at the end of the Project Description Portable Document Format (PDF) file. Therefore include the following items **ONLY**:

- Letter(s) of institutional and academic department(s) commitment to implementation and institutionalization of the proposed curriculum signed by the Dean of the Engineering College/School or the Dean of Science (**required**) of the participating institutions. **This signed statement is not part of the proposal page limit.**
- List of academic participants and list of industrial firms and contacts providing support in this project. (Not part of the proposal page limit)
- Cost sharing at the level of at least 25% is **required** from **all** academic institutions participating in the proposal and cost sharing is strongly encouraged from industry or other organizations. The cost sharing may come from any private or non-Federal public source and may be in cash or in-kind, fairly valued (see OMB Circular A-110, Section C, Subpart.23).  
*<http://www.whitehouse.gov/WH/EOP/OMB/html/circulars/a110/a110.html>. A statement, signed by an authorized organizational representative, confirming this commitment must accompany the proposal and if industrial or other organization cost-sharing is included, a signed statement from an authorized industry/other organization*

official must also accompany the proposal. These signed statements are not part of the proposal page limit.

**If these signed statements of commitment from the institution(s) to implementation of the proposed curriculum as well as to cost sharing are not submitted with the proposal, then the proposal will be returned to the Principal Investigator without review.**

- Letter(s) from industry regarding the importance of the technology area and its impact on U.S. industrial competitiveness are required as well as the anticipated involvement of the industry in the project. (Not part of the proposal page limit).
- References Cited-Proposal Section D (not part of the proposal page limit).
- Biographical sketches-Proposal Section E (not part of the proposal page limit). A curriculum vitae of each of the principal investigators and co-principal investigators involved in the project (maximum length, two pages each). These should be complete enough to demonstrate the expertise necessary to conduct the proposed project. Please include a statement, no longer than one page, for each PI and co-PI describing their specific roles in the project.
- Budget (NSF Form 1030)-Proposal Section F. Provide a summary budget for the total award period, and annual budgets showing costs for each of the years requested. Any equipment funds requested from NSF must at minimum be matched by in-kind or by non-federal dollars. Please note that the awardees will be expected to participate in an annual, two-day Grantees Conference for the Combined Research-Curriculum Development Program probably in the Washington, D.C. area. Therefore, funds should be budgeted for these meetings. (not part of the proposal page limit).

If a proposal includes funding for any subawardees, the lead institution's summary and annual budgets should include the total amount for any subawardees in Line G.5., "Subawards." In addition a complete budget (NSF Form 1030) must be submitted for each subaward along with detailed justification signed by that institution's authorized organizational representative for the subaward. (not part of the proposal page limit).

- Current and Pending Support (NSF Form 1239)-Proposal Section G. Include this form for the Principal Investigator and co-Principal Investigators.(not part of the proposal page limit).
- Facilities, Equipment and Other Resources (NSF Form 1363)-Proposal Section H. (not part of the proposal page limit).

**No videotapes, diskettes, textbooks, or CD-ROMs will be accepted. Proposals not adhering to the guidelines set forth above will be returned to the Principal Investigator without review.**

## **B. Deadline for Proposal Submission:**

Full proposals **MUST** be submitted by **5 p.m. (Submitter's Local Time) Friday, May 21, 1999**. Copies of the signed proposal sheet must be submitted in accordance with the instructions identified below.

*Submission of Signed Cover Sheets.* The signed proposal Cover Sheet (NSF Form 1207) must be forwarded to the following address and received by NSF by **Friday, May 28, 1999:**

**Announcement No. NSF 99-72  
DIS FastLane Cover Sheet  
National Science Foundation  
4201 Wilson Blvd.  
Arlington, VA 22230**

All proposals or any supporting materials or letters submitted in response to this announcement that are received after the deadline dates cited above will be returned without review.

## **C. NSF FastLane Requirements**

CRCD proposals **MUST** be submitted electronically using the **NSF FastLane system** for electronic proposal preparation and submission. The FastLane system is available through the Web at the FastLane Web site at <http://www.fastlane.nsf.gov>. The Sponsored Research Office (CRO or equivalent) must provide a Fast Lane Personal Identification Number (PIN) to each Principal Investigator (PI) to gain access to the FastLane "Proposal Preparation" application. Principal Investigators who have not submitted a proposal to NSF in the past must contact their SRO to be added to the NSF PI database. This should be done as soon as the decision to prepare a proposal is made.

In order to use NSF FastLane to prepare and submit a proposal, the following are required:

Browser (must support multiple buttons and file upload)

- Netscape 3.0 or greater
- Microsoft Internet Explorer 4.01 or greater

PDF Reader (needed to view/print forms)

- Adobe Acrobat 3.0 or greater

PDF Generator (needed to create project description)

- Adobe Acrobat 3.01 or greater
- Aladdin Ghostscript 5.10 or greater

A list of registered institutions and the FastLane registration form are located on the FastLane Web page.

Proposers are strongly advised to ensure that the required registrations have been completed, and the necessary software is available, well before the proposal submission deadline. The FastLane instructions specify how to obtain help if needed.

**Facsimile (FAX) copies of proposals will not be accepted. Any that are received will be returned without review.**

## **9. Merit Review Process and Criteria**

NSF grants are awarded on a competitive basis. In selecting awards for this competition the NSF will be assisted by reviewers drawn from academe, industry, government, and professional societies who have strong technical and educational expertise. The review process will be carried out by panels consisting of reviewers having expertise in the research areas supported by ENG and CISE. Proposals submitted in response to this program announcement will be subject to revised merit review criteria approved by the National Science Board on March 28, 1997 (NSF 97-72). The revised criteria are designed to be useful and relevant across NSF's many different programs, however, NSF will continue to employ special criteria as required to highlight the specific objectives of certain programs and activities.

The revised merit review criteria are listed below. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

### **What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field and across different fields? What are the qualifications and demonstrated capabilities of the project team, their understanding of the issues involved in engineering and science education reform and their commitment to the accomplishment of the effort? How well qualified is the proposer (individual or team) to conduct the project? How innovative is the proposed curriculum development effort? How well conceived and organized is the plan for project management and operation of the project; (particularly necessary when more than one institution is involved).

### **What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How important is the technological area and potential impact on U.S. industrial competitiveness and education? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? How effective will the project dissemination plan be in resulting in national impact? What is the potential impact of the

effort on engineering and/or computer and information science students and on the overall engineering and/or computer and information science curriculum?

In addition to the two evaluation criteria stated above, NSF will consider the following factors in making awards:

### **Integration of Research and Education**

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learner perspectives. Principal Investigators should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

### **Integrating Diversity into NSF Programs, Projects, and Activities**

Broadening opportunities and enabling the participation of all citizens-women and men, underrepresented minorities, and persons with disabilities-is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports. Principal Investigators should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

In addition to the above review criteria, reviewers will be asked to use the following additional criteria when reviewing proposals that respond to this announcement. These criteria are taken from the key features of a CRCD project as described above:

- Degree of integration of research into curriculum development efforts;
- Potential impact of the project on the education of engineering and/or computer and information science students and on the overall engineering and/or computer and information science curriculum;
- Effectiveness of the proposed evaluation plan;
- Involvement of persons with expertise in educational methodologies, instructional design/technology and pedagogy as appropriate;
- Demonstrated commitment of the institution(s) to implementation and institutionalization of the curriculum; and

- Level of commitment and involvement of industrial sponsors

A summary rating and accompanying narrative will be completed and signed by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers are mailed to the Principal Investigator by the CRCRD Program Manager.

## **10. Inquiries**

### **Overall CRCRD Program Manager**

Mrs. Mary Poats, Engineering Education and Centers (EEC),  
mpoats@nsf.gov, (703) 306-1380, Fax: (703) 306-0326 or (703) 306-0290

### **ENG Division Coordinators**

Dr. Sohi Rastegar, Bioengineering and Environmental Systems  
(BES), srastegar@nsf.gov, (703) 306-1320

Dr. Robert Wellek, Chemical and Transport Systems (CTS),  
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Dr. Kishan Baheti, Electrical and Communications Systems  
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Dr. Vijay Gopu, Civil and Mechanical Systems (CMS),  
vgopu@nsf.gov, (703) 306-1360

Dr. Lawrence Seiford, Design, Manufacture, and Industrial  
Innovation (DMII), lseiford@nsf.gov, (703) 306-1330

### **CISE Coordinators**

Dr. Harry Hedges and Dr. Stephen Mahaney, Division of Experimental and Integrative  
Activities (EIA), CISE Directorate, hhedges@nsf.gov, smahaney@nsf.gov (703) 306-  
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## **11. ADMINISTRATION OF GRANTS**

Awards will be administered in accordance with the applicable NSF Grant General Conditions, GC-1 or FDP-III, copies of which are available on the NSF home page (<http://www.nsf.gov>) or may be requested from the National Science Foundation, P.O. Box Box 218, Jessup, MD 20794-0218, (301) 947-2722 or e-mail at pubs@nsf.gov. More comprehensive information is contained in the NSF Grant Policy Manual (NSF 95-26) available on the NSF home page or through a subscription offered by Superintendent of Documents, Government Printing Office, Washington, DC 20402.

## **ADDITIONAL INFORMATION**

For information about CRCD projects funded in previous competitions please visit the CRCD web page at <http://www.eng.nsf.gov/eec/crcd>. These awards are listed according to technological area of the project.

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090 or through FIRS on 1-800-877-8339.

This program is described in the Catalog of Federal Domestic Assistance, Category 47.041, Engineering Grants and Category 47.070, Computer and Information Science and Engineering.

## **PRIVACY ACT AND PUBLIC BURDEN STATEMENTS**

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another

Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response. Including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne H. Plimpton, Reports Clearance Officer; Division of Administrative Services; National Science Foundation; Arlington, VA 22230.

## **YEAR 2000 REMINDER**

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

## **References**

- 1 Floraline Stevens *et al.*, "User-Friendly Handbook for Project Evaluation: Science, Mathematics, Engineering, and Technology Education," NSF Division of Research, Evaluation, and Communications, Directorate for Education and Human Resources, NSF 93-152, National Science Foundation, 1993 (reprinted in 1996).
- 2 Joy Frechtling and Laure Sharp, "User-Friendly Handbook for Mixed Method Evaluations," NSF Division of Research, Evaluation, and Communications, Directorate for Education and Human Resources, NSF 97-153, National Science Foundation, 1997.
- 3 Gloria M. Rogers and Jean K. Sando, "Stepping Ahead: An Assessment Plan Development Guide," Report of an NSF-Supported Workshop on Outcomes Assessment, Rose-Hulman Institute of Technology, Terre Haute, IN, 1996.

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